Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A ~~nonresonant~~ micromachined gyroscope <u>operated in a nonresonant mode</u> comprising:

<u>three interconnected masses;</u>

a drive-mode oscillator; and

a sense-mode oscillator, where the drive-mode oscillator and sense-mode oscillators are mechanically decoupled and employ <u>the</u> three interconnected ~~proof~~ masses.

2. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator by means of their chosen design parameters ~~relating to coupling constants and mass~~ dynamical amplify movement in the drive and sense directions to achieve large oscillation amplitudes without resonance whereby increased bandwidth and reduced sensitivity to structural and thermal parameter fluctuations and damping changes results.

3. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 <u>wherein the drive-mode oscillator drives the three interconnected masses in a drive direction, wherein the sense-mode oscillator senses movement of two of the three interconnected masses in a sense direction,</u> wherein one of the three masses is an

enlarged intermediate ~~proof~~ mass and another is a sensing element, and wherein the drive-mode oscillator and sense-mode oscillator are mechanically decoupled in the drive direction from the sense direction whereby robustness and long-term stability is achieved, so that the Coriolis force generated by means of the enlarged intermediate ~~proof~~ mass results in larger Coriolis forces for increased ~~sensor~~ sensitivity whereby control system requirements and tight fabrication and packaging tolerances are relaxed, mode-matching is eliminated, and instability and zero-rate drift due to mechanical coupling between the drive and sense modes is minimized.

4. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator include a drive means for driving a mass in a drive direction and a sense means for sensing motion of a mass in a sense direction, and wherein the three interconnected masses comprise a first, second and third mass, the first mass being the only mass excited by the drive means, oscillating in the drive direction and being constrained from movement in the sense direction, the second and third masses being constrained from movement with respect to each other in the drive direction and oscillating together in the drive direction but oscillating independently from each other in the sense direction, the third mass being fixed with respect to the second mass in the drive direction, but free to oscillate in the sense direction, the drive-mode oscillator comprising the first, ~~mass as a driven mass and the~~ second and third masses which collectively act as a passive mass ~~comprising the drive-mode oscillator~~, the second and third masses comprising the sense-mode oscillator.

5. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 4 wherein the second mass oscillates in the drive and sense directions to generate a rotation-induced Coriolis force that excites the sense-mode oscillator, and where a sense direction response of the third mass, which comprises the vibration absorber of the sense-mode oscillator, is detected for measuring the input angular rate.

6. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving ~~a~~ <u>the three interconnected</u> mass<u>es</u> in a drive direction, a sense means for sensing motion of <u>at least one of the three interconnected masses</u> ~~another mass~~ in a sense direction, and a substrate on which the drive-mode oscillator and sense-mode oscillator are disposed, wherein the three interconnected masses comprise a first, second and third mass, where the first mass is anchored to the substrate by a first flexure which allows movement substantially only in the drive direction, where the second mass is coupled to the first mass by a second flexure that allows movement in the drive and the sense directions, and where the third mass is coupled to the second mass by a third flexure which allows movement relative to the second mass substantially only in the sense direction.

7. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 6 wherein the first, and third flexures are folded micromachined springs having a resiliency substantially in only <u>a first</u> ~~one~~ direction and wherein the second flexure is comprised of two coupled folded micromachined springs, <u>one of the two coupled folded</u>

micromachined springs ~~each~~ having a resiliency substantially in only one of the first or a second direction orthogonal to the first direction ~~two different directions~~ and the other one of the two coupled folded micromachined springs having a resiliency substantially in only the other one of the first or second directions.

8. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator are arranged and configured to each have a frequency response with two resonant peaks and a flat region between the peaks, the gyroscope being operated at a frequency in the flat regions of the frequency responses of the drive and sense-mode oscillators.

9. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 8 wherein the drive-mode oscillator and sense-mode oscillator are arranged and configured to have matching drive and sense direction anti-resonance frequencies.

10. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 wherein the drive-mode oscillator comprises a drive means for driving a mass in a drive direction and the sense-mode oscillator comprises ~~a drive means for driving a mass in a drive direction, and~~ a sense means for sensing motion of a mass in a sense direction, wherein the three interconnected masses comprise a first, second and third mass and coupled flexures, the second and the third masses combining to comprise a vibration absorber of the drive-mode oscillator, which vibration absorber mechanically amplifies the oscillations of the first mass.

11. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 10 wherein the first mass is driven at a driving frequency, ω_{drive}, by means of a input force F_d, which driving frequency, ω_{drive}, is matched with the resonant frequency of an isolated passive mass-spring system comprised of the second and third masses and coupled flexures, which passive mass-spring system moves to cancel out the input force F_d applied to the first mass, so that maximum dynamic amplification is achieved.

12. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 wherein the drive-mode oscillator comprises a drive means for driving a mass in a drive direction and the sense-mode oscillator comprises ~~a drive means for driving a mass in a drive direction, and~~ a sense means for sensing motion of a mass in a sense direction, wherein the three interconnected masses comprise a first, second and third mass and coupled flexures, where the third mass acts as the vibration absorber of induced movement in the sense direction arising from the second mass in the sense-mode oscillator to achieve large sense direction oscillation amplitudes due to mechanical amplification.

13. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 12 wherein a sinusoidal Coriolis force is applied to the second mass, and where the frequency of the sinusoidal Coriolis force is matched with a resonant frequency of the isolated passive mass-spring system of the third mass and its coupled flexures, so that the third mass achieves maximum dynamic amplification.

14. (currently amended) The ~~nonresonant~~ micromachined gyroscope of claim 1 wherein the drive-mode oscillator comprise a drive means for driving three interconnected masses in a drive direction, and the sense-mode oscillator comprises ~~a drive means for driving a mass in a drive direction, and~~ a sense means for sensing motion of at least one of the three interconnected masses ~~a mass~~ in a sense direction, wherein the three interconnected masses comprise a first, second and third mass and ~~coupled~~ flexures coupled to each of the first, second and third masses, wherein the frequency response of both the drive-mode oscillator and sense-mode oscillator have two resonant peaks and a flat region between the peaks, wherein both of the drive-mode oscillator and sense-mode oscillator are operated in the flat region of their response curves, and where the drive anti-resonance frequency, ω_{2x}, of the second mass and sense anti-resonance frequency, ω_{3y}, of the third mass are matched, namely where $\omega_{3y} = \omega_{2x}$, or equivalently $(k_{3y}/m_3)^{1/2} = (k_{2x}/(m_2 + m_3))^{1/2}$ determines the optimal system parameters, together with the optimized ratios $\mu_x = (m_2 + m_3)/m_1$, $\gamma_x = \omega_{2x}/\omega_{1x}$, $\mu_y = m_3/m_2$, and $\gamma_y = \omega_{3y} / \omega_{2y}$, where k_{3y} is the spring constant of the flexures coupled to the third mass, where m_3 is the magnitude of the third mass, k_{2x} is the spring constant of the flexures coupled to the second mass, m_2 is the magnitude of the second mass, m_3 is the magnitude of the third mass, ω_{1x} is the drive anti-resonance frequency of the first mass, and ω_{2y} is the sense anti-resonance frequency of the second mass.

15. (currently amended) A method of nonresonantly operating a ~~nonresonant~~ micromachined gyroscope comprising:

driving a drive-mode oscillator with an applied force to define a first motion of the drive-mode oscillator;

driving a sense-mode oscillator with a Coriolis force derived from the drive-mode oscillator to define a second motion of the sense-mode oscillator; and

~~mechanically~~ decoupling the first motion of the drive-mode oscillator from the second motion of the ~~and~~ sense-mode oscillator~~s~~.

16. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator and driving the sense-mode oscillator dynamical amplifies motion in the drive and sense directions to achieve large oscillation amplitudes without resonance to result in increased bandwidth and reduced sensitivity to structural and thermal parameter fluctuations and damping changes.

17. (currently amended) The method of claim 15 where mechanically decoupling the drive-mode oscillator and sense-mode oscillator~~s~~ comprises mechanically decoupling the drive-mode oscillator and sense-mode oscillators in the drive direction from the sense direction and exciting a sense element in the sense-mode oscillator by a Coriolis force generated by an intermediate ~~proof~~ mass employed in both the drive-mode and sense mode oscillators, the intermediate ~~proof~~ mass being provided with a larger mass than the sense element, resulting in larger Coriolis forces for increased ~~sensor~~ sensitivity whereby control system requirements and tight fabrication and packaging tolerances are relaxed, mode-matching is eliminated, and instability and zero-rate drift due to mechanical coupling between the drive and sense modes is minimized.

18. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator comprises driving a first, second and third mass in a drive direction and driving the sense-mode oscillator comprises driving a second and third mass ~~in a drive direction and sensing motion of a mass~~ in a sense direction, ~~and wherein the drive-mode oscillator and the sense-mode oscillator comprise three interconnected masses namely a first, second and third mass,~~ exciting the first mass only by a drive means, oscillating the first mass in the drive direction with a driving force and constraining movement of the first mass from ~~in~~ the sense direction, constraining movement of the second and third masses with respect to each other from ~~in~~ the drive direction, oscillating the second and third masses together in the drive direction but oscillating the second and third masses independently from each other in the sense direction, the third mass being fixed with respect to the second mass in the drive direction, oscillating the third mass in the sense direction~~, the first mass as a driven mass and the second and third masses collectively as a passive mass comprising the drive-mode oscillator, the second and third masses comprising the sense-mode oscillator~~.

19. (previously presented) The method of claim 18 wherein oscillating the second mass in the drive and sense directions generates a rotation-induced Coriolis force that excites the sense-mode oscillator, and detecting a sense direction response of the third mass, which comprises the vibration absorber of the sense-mode oscillator, for measuring the input angular rate.

20. (currently amended) The method of claim 15 wherein the drive-mode oscillator comprises a drive means for driving a mass in a drive direction and the sense-mode oscillator comprises ~~a drive means for driving a mass in a drive direction,~~ a sense means for sensing motion of a mass in a sense direction, and further comprising a substrate on which the drive-mode oscillator and sense-mode oscillator are disposed, ~~wherein the three interconnected masses comprise a first, second and third mass, further comprising~~ anchoring a ~~the~~ first mass to the substrate by a first flexure and moving the first mass substantially only in the drive direction, moving a ~~the~~ second mass coupled to the first mass by means of transferring force through a second flexure in the drive and the sense directions, and moving a ~~the~~ third mass coupled to the second mass by means of transferring force through a third flexure substantially only in the sense direction.

21. (currently amended) The method of claim 20 where anchoring the first mass ~~further~~ comprising coupling the first mass, ~~second and third masses~~ by the first ~~and third~~ flexure~~s~~ to the substrate by coupling the first mass using a ~~providing~~ folded micromachined spring~~s~~ having a resiliency substantially in only one direction, where moving the second mass comprises coupling the second mass to the substrate by the third flexure by coupling the second mass using a folded micromachined spring having a resiliency substantially in only one direction and where moving the third mass comprises coupling the third mass to the second mass by coupling the third mass using ~~by~~ the second flexure which is comprised of two coupled folded micromachined springs, one of the two coupled folded micromachined springs ~~each~~ having a resiliency

substantially in only one of the first or a second direction orthogonal to the first direction ~~two different directions~~ and the other one of the two coupled folded micromachined springs having a resiliency substantially in only the other one of the first or second directions.

22. (previously presented) The method of claim 15 wherein driving the drive-mode oscillator and driving sense-mode oscillator comprises operating the gyroscope in the flat regions of the drive and sense-mode oscillators between two resonant peaks.

23. (previously presented) The method of claim 22 further comprising matching drive and sense direction anti-resonance frequencies of the drive-mode oscillator and sense-mode oscillator.

24. (currently amended) The method of claim 15 wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving three interconnected masses ~~a mass~~ in a drive direction, and a sense means for sensing motion of at least one of the three interconnected masses ~~a mass~~ in a sense direction, wherein the three interconnected masses comprise a first, second and third mass and coupled flexures, the second and the third masses combining to comprise a vibration absorber of the drive-mode oscillator, further comprising mechanically amplifying the oscillations of the first mass by means of the vibration absorber.

25. (original) The method of claim 24 further comprising driving the first mass at a driving frequency, ω_{drive}, by means of a input force F_d, matching the driving frequency, ω_{drive}, with the resonant frequency of an isolated passive mass-spring system comprised of the second and third masses and coupled flexures, and moving the passive mass-spring system to cancel out the input force F_d applied to the first mass, so that maximum dynamic amplification is achieved.

26. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator comprises driving three interconnected masses in a drive direction and driving the sense-mode oscillator comprises ~~driving a mass in a drive direction, and~~ sensing motion of at least one of the three interconnected masses ~~a mass~~ in a sense direction, and wherein driving the drive-mode oscillator comprises driving three interconnected masses in a drive direction and driving the sense-mode oscillator comprises mechanically amplifying sense direction oscillation amplitudes in one of the three interconnected masses ~~with a third mass~~ acting as the vibration absorber in the sense-mode oscillator.

27. (currently amended) The method of claim 26 wherein the three interconnected masses include a first, second and third mass and further comprising applying a sinusoidal Coriolis force to the ~~a~~ second mass, and matching the frequency of the sinusoidal Coriolis force with a resonant frequency of an isolated passive mass-spring system comprised of the third mass and its coupled flexures, so that the third mass achieves maximum dynamic amplification.

28. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator comprise driving a first, second and third mass in a drive direction and driving the sense-mode oscillator comprises driving the second mass in a sense direction ~~driving a mass in a drive direction,~~ and sensing motion of ~~a~~ the third mass in ~~a~~ the sense direction, wherein the frequency response of both the drive-mode oscillator and sense-mode oscillator have two resonant peaks and a flat region between the peaks, operating both the drive-mode oscillator and sense-mode oscillator in the flat region of their response curves, and matching the drive anti-resonance frequency, ω_{2x}, of the second mass and sense anti-resonance frequency, ω_{3y}, of the third mass, namely setting $\omega_{3y} = \omega_{2x}$, or equivalently $(k_{3y}/m_3)^{1/2} = (k_{2x}/(m_2 + m_3))^{1/2}$ and determining therefrom the optimal system parameters, together with the optimized ratios $\mu_x = (m_2 + m_3)/m_1$, $\gamma_x = \omega_{2x}/\omega_{1x}$, $\mu_y = m_3/m_2$, and $\gamma_y = \omega_{3y} / \omega_{2y}$, where k_{3y} is the spring constant of the flexures coupled to the third mass, where m_3 is the magnitude of the third mass, k_{2x} is the spring constant of the flexures coupled to the second mass, m_2 is the magnitude of the second mass, m_3 is the magnitude of the third mass, ω_{1x} is the drive anti-resonance frequency of the first mass, and ω_{2y} is the sense anti-resonance frequency of the second mass.